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ABSTRACT

The ability to delay gratification among learners could serve as an effective learning strategy useful to diminish the detrimental effect of test anxiety. Academic delay of gratification refers to students' postponement of immediately available opportunities to satisfy impulses in favor of pursuing chosen important academic rewards or goals that are temporally remote but ostensibly more valuable. Using hierarchical regression analysis, this association was explored for 364 students. An association was found between academic delay of gratification and test anxiety once motivational, cognitive, and self-regulated factors are controlled. These findings suggest that academic delay of gratification may serve to enhance students' goal enhancement, which in turn results in high academic achievement. These results also suggest that delay of gratification may function as a learning strategy that buffers the detrimental effect of test anxiety by helping learners protect academic goals from nonacademic alternative strategies. These results also indicate that self-efficacy, regulation of time, and study environment are negative predictors of test anxiety, while delay of gratification, extrinsic goal orientation, and rehearsal are positive predictors of test anxiety. An appendix contains the Academic Delay of Gratification Scale (H. Bembenutty, 1997). (Contains 1 figure, 7 tables, and 59 references.) (SLD)

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Abstract

The ability to delay gratification among learners could serve as an effective learning strategy useful to diminish the detrimental effect of test anxiety. Despite the importance of this phenomenon, we still know relatively little about the association between academic delay of gratification and test anxiety. Academic delay of gratification (ADOG) refers to students' postponement of immediately available opportunities to satisfy impulses (e.g., go to a favorite concert the day before a test even though the student is not well-prepared) in favor of pursuing chosen important academic rewards or goals that are temporally remote but ostensibly more valuable (e.g., stay home studying to get later a good grade in the test). Using hierarchical regression analyses , in this study (N = 364) we explored this association and found that there is an association between academic delay of gratification and test anxiety once motivational, cognitive, and self-regulated factors are controlled. These findings suggest that academic delay of gratification may serve to enhance students' goal enhancement, which in turn results in high academic achievement. These results also suggest that delay of gratification may function as a learning strategy that buffers the detrimental effect of test anxiety by helping learners protecting academic goals from non-academic attractive alternatives. These results also indicate that self-efficacy, regulation of time and study environment are negative predictors of test anxiety while delay of gratification, extrinsic goal orientation,

and rehearsal are positive predictors of test anxiety. The implications for education of these results are discussed.

Emotion Regulation and Test Anxiety: The Contribution of Academic Delay of Gratification

How do anxious students cope with anxiety? Among the strategies associated with emotion regulation are the students' actions intended to control their environment (Corno, 1993; García et al., 1998; Kuhl, 1985; Snow, Corno & Jackson, 1996; Zimmerman & Martínez-Pons, 1986), seeking help from available sources (Karabenick, 1998), changing attributions, setting new goals, engaging in strategic planning, increasing self-efficacy beliefs and intrinsic interest (Pintrich & De Groot, 1990; Zimmerman, 1998a, 1998b, 2000a). In an academic setting, regulation of emotion and affect before and during test taking is imperative because it could determine academic achievement and performance (Schutz & Davis, in press; Schutz et al., 1999). It is well documented that deficiencies in test taking strategies, cognitive capacity, and poor study habits interfere with academic performance among test anxious learners (Benjamin, McKeachie, & Lin, 1987; Culler & Holahan, 1980; McKeachie, 1999; Tobias, 1985). Despite the importance of this phenomena, we still know relatively little about how other factors, such as the students' preference to delay gratification in an academic context is related to test anxiety (henceforth called academic delay of gratification to emphasis its content specificity). Some exam performance depends on whether the students continue to study, even when anxiety has arisen and attractive alternatives demand attention, such as attending a party. Achievement

of long-term academic goals may depend on the students' ability to delay gratification.

Previously, we have found (Bembenutty, 1997; Bembenutty & Karabenick, 1998; Bembenutty, Karabenick, McKeachie, & Lin, 1998) that there was no a significant association between test anxiety and academic delay of gratification. However, we believe that the relation between academic delay of gratification and test anxiety is complex and a further examination is warranted. We believe that it is possible that if other students' characteristics are controlled, then the relation between delay of gratification and test anxiety could be found. We believe so because there is evidence supporting the notion that some students are prompt to experience high-test anxiety level while there are others who appear to engage in test taking activities without difficulties. We also believe that this association may be mediated by learners' motivational tendencies, use of cognitive strategies, and use of resource management (Pintrich & De Groot, 1990).

Thus, the purpose of the present study was to examine the relation between learners' preference for academic delay of gratification and their level of test anxiety when controlling for other motivational and self-regulatory variables. We examined whether students use academic delay of gratification in an effort to buffer against the detrimental effect of test anxiety (Mendoza-Denton, Freitas, & Downey, 1997).

Test Anxiety

Test anxiety has two components, which influence learners: emotionality and cognition (Hofer, Yu, & Pintrich, 1998; Liebert & Morris, 1967; Spielberger, Anton & Bedell, 1976; Spielberger & Vagg, 1995). The *emotionality component* refers to physical arousal during performance (Spielberger & Vagg, 1995). The *cognitive component* refers to the worry that interferes with attention, concentration, and effective information processing (Naveh-Benjamin, McKeachie & Lin, 1987; Benjamin, McKeachie, Lin, Halinger, 1981; Tobias, 1985), which can be detrimental to knowledge acquisition as well as performance. Among the two components of test anxiety, worry rather than emotionality has been identified as having the most pervasive effect on academic performance (Bedell & Marlowe, 1995; Spielberger, 1980). A promising conceptual approach to the constellation of student' characteristics that may moderate the effects of anxiety is the students' ability to delay gratification.

Delay of Gratification: A General Approach

In general, Mischel and his associates have done the most comprehensive series of studies on delay of gratification (Mischel, Cantor, Feldman, 1996). In Mischel's paradigm, children are asked to choose between a less valuable immediately available reward (e.g., one cookie) and a larger reward (e.g., several cookies) if they wait. In a controlled experimental condition, the experimenter explains to the children that if they were able to wait until he or she returns to the room, they would obtain the larger reward. If the children were unable to wait until the experimenter returns, the children could ring a bell that will bring

the experimenter back to the room. In this case, the children will receive only the smaller reward.

In a longitudinal study, the same children who as a preschoolers participated in the studies were follow up and found that those who delay gratification, as adolescence, were more highly achieving, orally fluent, academically oriented, intelligent, and have higher academic achievement during high school than were preschoolers who preferred immediate gratification. In a subsequent follow-up longitudinal study, the same individuals were follow when they were about 30 years. The same preschoolers children, now as adults, as well as their parents reported that their ability to delay gratification helped them to deal with stress and frustration (Ayduk, 1999).

Delay of Gratification: An Academic Approach

To emphasis the academic domain specificity of delay of gratification, we label it academic delay of gratification. We define *academic delay of gratification* (ADOG) as students' preference for an immediately available option (e.g., go to a favorite concert the day before a test even though the student is not well-prepared) or a delayed alternative (e.g., stay home studying to get later a good grade in the course). Bembenutty developed the Academic Delay of Gratification Scale (ADOGS) to assess individual differences in academic delay of gratification (ADOG; Bembenutty, 1997; Bembenutty & Karabenick, 1997; Bembenutty, Karabenick, McKeachie, & Lin, 1998). The ADOGS operationalizes ADOG by determining the likelihood that

students would select activities associated with long- versus short-term goal satisfaction. For each situation, the students first rated their preference for an option that offered immediate gratification, such as "Going to a favorite concert, play, or sporting event, even though it may mean getting a lower grade on an exam in this class to be taken the next day," or a delayed gratification option such as: "Staying home and studying to increase your chances of getting a higher grade."

Using the ADOGS, we demonstrated extensive associations between students' achievement motivation tendencies and use of learning strategies (Bembenutty & Karabenick, 1998; Bembenutty, Karabenick, McKeachie, & Lin, 1998). Specifically, students reporting greater delay of gratification were both more academically motivated (e.g., higher self-efficacy and intrinsic interest in learning) and likely to use cognitive (e.g., critical thinking), metacognitive, and resource management strategies (e.g., effort management). In other words, more as compared to less motivated students, were more likely to choose to delay gratification, just as they were to use other several other strategies to accomplish their academic goals. Strong relation between delay and students' use of resource management strategies were especially important in linking ADOG to the general self-regulatory framework and suggesting further examination of its relation to volitional processes. Thus, from an education perspective, academic delay of gratification is considered a learning strategy that fits well the description of Weinstein and Mayer (1986), who stated that "the goal of any particular learning strategy may be to affect the learner's motivational or affective state, or

the way in which the learner selects, acquires, organizes, or integrates new knowledge" (p. 315)

We believe that it is possible that for some anxious students is a successful coping strategy. For example, in a recent study with college students, Ayduk (1999) examined whether delay of gratification moderates the reaction to rejection, which is an emotional reaction. Ayduk found that delay functions as a defensive mechanism that buffered and suppressed the negative effects of rejection sensitivity for students with high ability to delay gratification. The students were able to transform the stressful situations into a less stressful situation. In a different study, Mendoza-Denton, Freitas, and Downey (1997) examined whether delay of gratification buffers against aggression among rejection-sensitive adolescents. They found that indeed, high ability to delay gratification buffers against negative emotional situation.

Academic Delay of Gratification, Test Anxiety, Motivational, and Self-regulation

Regulation of emotions, such as test anxiety may be a function of students' ability to manage their motivation. In expectancy-value terms, students' delay preferences are determined by the summed expected value of alternative courses of action (Atkinson, 1966; Eccles, 1983, Wigfield, 1994; Wigfield & Eccles, 2000) . However, one factor that may influence whether to continue studying or attend a party may be, among others, the combination of motivation, regulation of emotions,

and the ability to delay gratification. The more valuable is attaining the academic goal compared to that of attending the party, the more likely the person would be to delay gratification, but only if the learners are able to control their emotions. For example, high-test anxious students may decrease their level of expectancy for success and lead them to defensively devalue important learning outcomes. Indeed, Pekrun (1992) has posited that negative emotions interfere with learning by decreasing intrinsic motivation and enjoyment on tasks. Similarly, Turner and her associates (Turner et al., 1998) examined college students' shame reaction to exam feedback. They found that "students interviews suggested that exerting a high degree of effort may have a role in the instantiation of shame when students perceive that they have failed in an academic task that is important to them" (p. 17).

Another important motivational factor is self-efficacy. Self-efficacy refers to the beliefs that individuals possess about their ability to perform an expected task (Bandura, 1986; Zimmerman, 2000). Self-efficacy is related to successful academic performance (Bandura, 1982; Brackney & Karabenick, 1995; Zimmerman, 2000a, 2000b). Students with high self-efficacy may decide to continue working on an important assignment when test anxiety arises and when a temptation to stop call for attention. However, students with low self-efficacy beliefs may not only succumb to a temptation, they may let disruptive thoughts interfere with performance.

Students may differ in motivation depending on its source, such as whether it is intrinsic or extrinsic (Deci & Ryan, 1985; Pintrich & Schunk, 1996). According to

Pintrich, Smith, García, and McKeachie (1993), intrinsic goal orientation refers to students' enjoyment of participating in a task for the sake of learning, whereas extrinsic goal orientation refers to students' engagement in a task for reasons other than the task itself. Students may possess intrinsic but not extrinsic motivation, have extrinsic but not intrinsic motivation or have both or neither (Pintrich & García, 1994; Pintrich, 2000; Pintrich & Schunk, 1996; Stipek, 1996; Vallerand, Fortier, & Guay, 1997). For example, Pintrich, Roeser, and De Groot (1994) report that intrinsic goal orientation was not associated with test anxiety among junior high school students. However, the more intrinsically or extrinsically motivated students are for an academic task the more likely they would be to delay gratification. Test anxiety' influence on students may depend on it their use of cognitive strategies. Pintrich, Roeser, and De Groot (1994) reported that among junior high school students, test anxiety was not associated with students' use of cognitive strategies. Cognitive strategies refer to mental resources used by students to assimilate academic material, including such strategies as rehearsal, elaboration, organization, and critical thinking (Pintrich, Smith, García, & McKeachie, 1993). We know that academic delay of gratification is associated with these cognitive strategies. Thus, we sought to examine the association between delay and test anxiety after controlling for these cognitive strategies.

The use of self-regulated learning strategies may be especially important when emotions arise and alternatives to remain task focused become available.

According to Pintrich and his associates (Pintrich et al., 1993), resource management strategies, which include time dedicated to study and structuring of their study environment, the effort put into the learning process, and help seeking from peers and instructors, are all self-regulated strategies that enhance the learner's academic achievement in the classroom (Pintrich et al., 1993). These are similar as the learning strategies Zimmerman and Martinez-Pons (1986) identified by using an interview structure among learners. In these instances, management of available resources would be important to overcome the detrimental effect of test anxiety. In the present study, effort regulation and management of study and time will be investigated to see the pattern of association between these two learning strategies, delay of gratification, and test anxiety.

In sum, the present study was designed to provide additional evidence of the relation between academic delay of gratification and test anxiety. Specifically, the two research questions are: First, to what extent academic delay of gratification is related to test anxiety? Second, to what extent is academic delay of gratification associated to test anxiety when controlling for motivational and self-regulated variables?

Method

Participants

College students (N = 364; 40% males and 60% females) enrolled in introductory level psychology courses at a large, public, Midwestern university participated in the present study. Seventy four percent of the participants were Caucasians, 11% were African American, 1.6% were Asian American, 3.6% were Hispanics, 2% were Native American, and 2% were members of other minority groups. Because the questionnaires used stimulated reflection about motivation and learning and because they also received debriefing about the theory and design of the research, participants received course credit for their participation. The data were collected in the students' regular classroom during the eighth and ninth weeks of the semester. Participants signed a consent form to participate in the study and release their grades, and confidentiality of their responses was assured.

Measures

Academic Delay of Gratification. In this study, the students responded to 10 scenarios of the Academic Delay of Gratification Scale (ADOGS; Bembenutty, 1997; Bembenutty & Karabenick, 1998). The ten scenarios have an internal consistency Cronbach α = .70 (M = 2.83, SD = .47). The ADOGS examines students' delay of gratification preference in relation to the course in which they responded. The students rated their preference for an immediately available attractive option versus a delayed alternative. An example is "Go to a favorite concert, play, or sporting event and study less for this course even though it may mean getting a lower grade on an exam you will take tomorrow" versus "Stay home and study to increase your

chances of getting a higher grade" (see Appendix). Students responded on a four-point scale: "Definitely choose A," "Probably choose A," "Probably choose B," and "Definitely choose B." We consider ADOG as a continuous variable, thus, responses were coded and added for the ten items then divided by ten to obtain an average so that higher total scores indicated greater delay of gratification (range 1 to 4).

Motivational Strategies for Learning Questionnaire. The Motivational Strategies for Learning Questionnaire (MSLQ) assesses the students' course-specific motivation and use of learning strategies (Pintrich et al., 1993). The MSLQ consists of 81 statements in response to which students rated themselves using a 7-point scale ("not at all true of me" to "very true of me"). The MSLQ is divided into two major parts: 1) motivation and 2) learning strategies. Motivation scales include intrinsic and extrinsic goal orientation, task value, control beliefs, self-efficacy, and test anxiety. Learning strategies scales include cognitive strategies (e.g., rehearsal, elaboration, organization, and critical thinking), metacognitive strategies, and resource management (structuring of time and study environment, effort regulation, peer learning, and help seeking). Coding was applied so higher scores represent higher levels of motivation and use of learning strategies.

Final Course Grade. Final course grade from the psychology course in which the students participated in the present study was used as an index of achievement. Final grades in the course were converted to an 11-point scale ranging from E = 1 to A = 11.

Results

Preliminary analyses

We first examined gender and ethnic differences among the students. Since there were few students among some of the ethnic groups, we divided the groups in Caucasians and minorities students. In relation to academic delay of gratification, there were significant gender differences, $t_{(362)} = -2.65$, $p < .01$, that is, males ($M = 2.75$) have lower means that females ($M = 2.88$). In relation to delay if gratification, there were also significant ethnic differences, , $t_{(365)} = -2.49$, $p < .05$, that is Caucasians ($M = 2.79$) have lower means that minorities students ($M = 2.93$). Scheffé post hoc analyses revealed that Caucasians ($M = 2.79$) reported significantly lower tendencies for delay of gratification than African American students ($M = 3.04$). . Using t-test analyses, we found that there were not gender and ethnic differences on test anxiety. Since there were not gender and ethnic differences on the students' test anxiety level, further analyses will collapse the students.

Table 2 displays Crombach alpha, means, and standard deviations of all the variables used in the study. To investigate the association between the variables used in this study, zero-order correlations between all the variables were examined (see Table 3). To examine the significant predictors of test anxiety, hierarchical regression analyses were conducted. First, we entered as independent variables, ethnicity, gender and the interaction between gender and

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ethnicity. Since these three variables did not significantly contribute to the variance they were dropped from further analyses. Next, the motivational variables of internal control beliefs, use of metacognitive strategies, peer learning, and help seeking were dropped from the equation because of very low contribution to the variance.

Bivariate relations

The first question in this study was: First, to what extent academic delay of gratification is related to test anxiety? To what extent academic delay of gratification, final course grade, students' motivation, and use of learning strategies are related to test anxiety? Data was examined using Pearson correlation coefficients between all the variables used in the study. The correlation analyses reveal significant findings. Among the most significant findings one is that test anxiety was not associated to academic delay of gratification, $r_{(364)} = .03$, $p > .05$. Test anxiety was negatively correlated with final course grade, $r_{(364)} = .14$, $p < .05$, self-efficacy $r_{(364)} = -.33$, $p < .001$, study regulation, $r_{(364)} = -.15$, $p < .05$, and effort regulation, $r_{(364)} = -.19$, $p < .01$.

Academic delay of gratification was positively related to intrinsic and extrinsic goal orientation, task value, rehearsal, elaboration, organization, and critical thinking, study regulation, effort regulation, and final course grade. Final course grade is highly related to self-efficacy, $r_{(364)} = .64$, $p < .001$. Self-efficacy is strongly related to all of the variables in the study, with the exception of test

anxiety, with which it has a negative association. Regulation of time and study environment and effort regulation are both positively and significantly related to all of the variables, except to test anxiety, with which they have a negative association. Accordingly, the students' preference to delay gratification is associated with achieving academic goals such as high final course grade. They also report that their cognitive involvement in course work is associated to their ability to delay gratification and to control their environment.

Regression analyses

The second question considered in this study was: To what extent is academic delay of gratification associated to test anxiety when controlling for motivational and self-regulated variables? Is academic delay of gratification a significant predictor of learners' test anxiety level when other variables such students' motivation and use of learning strategies are considered? To answer this question, hierarchical regression analyses were conducted. As shown in Table 4, the dependent variable was test anxiety. The independent variables were entered in three blocks (Method = Enter). In the first block, academic delay of gratification and the motivational tendencies (intrinsic and extrinsic goal orientation, task value, and self-efficacy) were entered as the independent variables. Extrinsic goal orientation was a positive and significant predictor of test anxiety, $\beta = .22$, $p < .01$, while self-efficacy was a negative and significant predictor of test anxiety, $\beta = -.47$, $p < .001$). Academic delay of gratification,

intrinsic goal orientation, and task value were not significant predictors. As indicated by the R^2, these variables accounted for 17% of the variance; this change in R^2 is significantly different from zero.

In the second block, the independent variables were again academic delay of gratification and the motivational variables along with the cognitive learning strategies (rehearsal, elaboration, organization, and critical thinking). Again, extrinsic goal orientation was a positive and significant predictor of test anxiety, $\beta = .20$, $p < .01$. Self-efficacy was again a negative and significant predictor of test anxiety, ($\beta = -47$ $p < .001$). Again, academic delay of gratification, intrinsic goal orientation, task value, and the cognitive learning strategies were not significant predictors of test anxiety. The second block only added 1% to the variance, $R^2 = 18$, $p > .05$, but this change in R^2 was not significant.

At the third block, the independent variables were again academic delay of gratification, the motivational variables, the cognitive learning strategies along with the students' use of resource management strategies (time and study regulation and effort regulation). In the third block, academic delay of gratification emerges as a significant and positive predictor of test anxiety, $\beta = .15$, $p < .05$. It turns out that once again extrinsic goal orientation was a positive and significant predictor, $\beta = .19$, $p < .01$). Overall, the standardized beta weight of extrinsic goal orientation declined from 23 to 19 in the third block. Self-efficacy remained as the strongest negative and significant predictor of test anxiety, $\beta = -.39$, $p < .001$. In the third block, rehearsal appears as a significant

and positive predictor of test anxiety, $\beta = .13$, $p < .05$. Time and study management was a negative and significant predictor of test anxiety, $\beta = -.24$, $p < .01$. Intrinsic goal orientation, task value, elaboration, organization, critical value, and effort regulation were not significant predictors of test anxiety. Taken together, in the third block, the variables explained more of the variance, $R^2 = 23$, $p < .001$. In the third block, these variables are responsible for 4% more of the variance and have a significant change in the R^2.

To examine further the associations between test anxiety and the variables in the study, we split test anxiety by the median ($Md = 3.80$) and conducted a series of t-tests and correctional analyses. Table 5 shows the mean differences of test anxiety (low and high) of all the variables used in this study. The results indicate that the means of high and low anxious students only differ in self-efficacy. Low anxious students reported greater level of self-efficacy, ($M = 5.76$) than the high anxious students ($M = 5.08$), $t_{(182)} = 5.86$, $p < .001$. Low anxious students also reported greater use of time and study management, $t_{(182)} = 3.29$, $p < .01$, and effort regulation strategies, $t_{(182)} = 3.66$, $p < .001$, than the high anxious students. Low anxious students obtained higher final course grade ($M = 10.15$; B+) than the high anxious students, ($M = 9.01$; B-), $t_{(182)} = 4.01$, $p < .001$. There were no mean differences on delay of gratification, between the low and high anxious students. The results of the correlations among all of the variables used in this study for the low and high anxious students separately indicate that most of the correlations were similar to the ones obtained without split the groups. It

is important to note that final course grade was significantly related to delay of gratification among the low-test anxious students but no among the high anxious students. These results indicate that low anxious students who delay gratification obtain higher grade than high anxious students (see Table 6).

Given that academic delay of gratification was a significant predictor of test anxiety only after the resource management strategies were entered in the equation and that these variables are highly correlated, we needed was to examine whether there was multicollinearity between delay of gratification and the resource management strategies. We conducted a collinearity diagnostic, which provides an index of tolerance in which a proportion close to 1 will indicate collinearity among variables. In addition, variables with correlations greater than .70 should not be entered into a regression equation because they produce redundancy and create error. The correlation between delay and the resource management strategies is below. 70. In addition, an examination of the tolerance proportion indicates that none of the variables have a proportion greater than .69. These results indicate that there are not serious indications of multicollinearity among the variables.

Nevertheless and to be conservative given the high to moderate correlation between delay of gratification and the resource management strategies, we conducted a factor analysis to examine whether the three variables loaded in the same factors. Using a principal components factor analysis and varimax rotation, with one criterion, one factor was extracted that explained 76.2% of the

variance. We then computed a new variable composed of delay of gratification and the resource management strategies. We conducted a new regression analysis to predict test anxiety for the entire sample. The independent variables were the motivation scales and the cognitive learning strategies, along with the new computed variables, labeled composed resource management. The results of the regression indicate that by including the new variable, the model explains 20% of the variance; 3% less than the previous regression with delay as an independent predictor. The beta weights of the new computed variable is smaller ($\beta = -.17$, $p < .001$) than when the resource management strategies and delay were entered separate to the equation. However, the beta weights of extrinsic goal orientation and self-efficacy increased. In this analysis, rehearsal is not longer a significant predictor of test anxiety (see Table 7).

Discussion

This study extends the literature on test anxiety and emotion regulation among college students. First, we have found that test anxiety and academic delay of gratification are associated when controlling for motivational, cognitive, and self-regulatory variables. An examination of the differences between high and low anxious students on delay of gratification suggests that indeed there are students who are high anxious and do well in the course while there are other high anxious who obtained low final grade. Similarly, there are low anxious students who obtained high course grade while there are others who have low

performance. We observed this by examining the correlations between final course grade among low and high anxious students. Both correlations are positive and a z-test for testing the significance of the differences between these two correlations (r = .19 versus r = .09) indicates that these associations are not significantly different one from the other ($p < .05$).

Consequently, we believe that there are at least four types of anxious students represented here: First, high anxious, who delay gratification and do well in the course. These are the students who even though they experience tension and concern before and during test preparation they put effort regulation, seek help from peers, tutors, and teachers and set and enact goals. The second group are high anxious, who do not delay gratification and do badly in the course. These students are those who consumed by their negative thoughts and distractions that they give up under pressure and stress. They avoid the anxiety' detrimental effect by engaging in non-delay alternatives, such going to the party when they should be studying. They are not persistence under pressure and are unwilling to exercise self-control and emotional regulation. The third group is the low anxious who delay gratification and do well in the course. These students are highly efficacious about their academic competence and are willing to avoid distractions to secure task completion. The fourth group is the low anxious, who do not delay gratification and do badly in the course. These are the overconfidence, have low task value, and engage in task avoidance behavior. They will not engage in self-regulation because

obtaining a passing grade may be satisfactory to them. These students would prefer to go to a party rather than to study for a test because of littler interest on the task. Thus, for some high and low anxious students, delaying gratification is beneficial. We know that there may be several other combinations of these students, but these may be the most pronounced.

We argue that some high anxious students cope with anxiety by working harder during test preparation. They regulate their emotion during test preparation in such a way that when they are taking a test they are then prepared and energized with the necessary strategies that will help them to cope with cognitive distraction during test preparation. These students may use a defensive pessimism strategy to buffers the effects of test anxiety. Norem and Cantor (1986) defined defensive pessimism as a situation "in which people set unrealistically low expectations prior to entering a situation in order to prepare themselves for potential failure and to motivate themselves to work hard in order to avoid that failure" (p. 1209). Norem and Cantor (1986) examined this strategy among college students who have low expectations prior to work on an anagram task in comparison to the rest of the students. The students with low expectation students obtained performed similar to the rest of the students, however, the pessimist students revised more their task before completed them than the other students. Norem and Cantor argued that defensive pessimism students obtain high grade because their anxiety and confusion lead them to put effort on test preparation.

Similarly, García (1995) argued that defensive pessimism is a strategy that help students to cope with test anxiety situations in several ways: First, García posited that defensive pessimism help the students to play and plan the test taking preparation in advance to ensure success. Second, García also argued that defensive pessimism increases effort and harness anxiety. García suggested that defensive pessimism students have low self-efficacy, but they engage in managing their time and study environment. The defensive pessimism approach is relevant to the association between test anxiety and delay of gratification because delay of gratification could be one of the strategies used by these students. Delay of gratification is associated with high effort and time management

Similarly, Lazarus (1991) highlights the optimism view of test anxiety. Lazarus (1991) stated that "it is important to realize that emotions, even negative ones such as anxiety, do not always impair performance and, in fact, may actually facilitate it, or sometimes fail to change performance, at least on the average (p. 414). In a study, Lazarus and Eriksen (1952) compared the effect of negative feedback between stressed and non-stressed college students during an intelligence test. The stressed participants were falsely told that they have done poor on the test and the control group was told that they did well. Although the results showed no differences between the students, the large variability among the students indicated that among some of the stressed students did better in a second testing time. In the light of the evidence presented here, we expect a

positive association between academic delay of gratification and high-test anxious students.

Another cognitive interpretation of how high or low anxious students could be able to cope with anxiety is explained by Metcalfe and Mischel's (1999) "*hot*" and "*cool*" paradigm, which serves to explain pursuing and enactment of goals over time and obstacles (see also Metcalfe & Jacobs, 1998). The hot system is emotional, simple, reflexive, fast, accentuated by stress, and stimulus control. By contrast, the cool system is cognitive, complex, reflective, slow, attenuated by stress, and self-control. These two systems interact to facilitate goal pursuing and reduce emotional tension. The cool system secures enactment of goals and emotional reduction while the hot system responds to impulses, with high tendency for instant gratification and satisfaction of pleasure. In an academic context, successful delay of gratification will depend of which system dominates. For example, if a student has to study for a test, the input representation (e.g., study for a test) may lead primarily to the hot system (having fun with friends) indicating that the she does not want to complete to study. Cognitively, this conflict will develop test anxiety if the students are not well prepared for the test. However, the cool system may be activated by the awareness of negative consequences and them by the enhancement of self-efficacy. As Figure 1 illustrates, the student may be able to delay gratification. The importance of this mechanism is that it explains how emotional tension and test anxiety resolution could take place within a cognitive-affective system.

It is important to note that the results of the factor analysis which revealed one factor solution with academic delay of gratification and the resource management strategies is highly significant because it places delay of gratification among other important self-regulatory learning strategies. However, in a future, a confirmatory factor analysis will be necessary to provide further evidence of the factor solution.

It is necessary to comment on the important role of academic delay of gratification in education. A review of the literature revealed a need for a comprehensive instrument to measure college students' willingness for academic delay of gratification in a course-specific setting. The ADOGS is an instrument with adequate psychometric properties (see Bembenutty, 1997; Bembenutty & Karabenick, 1998). The current findings are consistent with previous research that suggests that students who choose to delay are more academically oriented than students who choose immediate gratification (Funder & Block, 1989; Funder, Block, & Block, 1989; Mischel, Shoda, & Peake, 1988; Mischel, Shoda, & Rodriquez, 1989; Shoda, Mischel, & Peake, 1990), but also more anxious. By narrowing the ratings to a specific academic course the assessment of delay of gratification, the present study demonstrated an extensive network of associations between delay of gratification and student's motivational tendencies and their use of learning strategies.

It is important also to comment on the limitations of this study, First, the ADOGS is a self-report instrument and therefore student's actual selection

between a delay or non-delay alternative it is not known. Thus, experimental validity is necessary to clarify the relationship between students' delay preference and actual alternative selection. A second concern is that although there were not gender and ethnic differences among the participants' level of test anxiety, there were significant differences on delay of gratification. Thus a question that remains is, Do differences in gender and ethnicity affect the relation between anxiety, delay of gratification and achievement? A final concern is that participants are college students. Thus, these findings may not replicate to students at different academic levels. In other words, whether these findings will replicate in a different sample is an empirical question.

In summary, the major contribution of this study was to demonstrate that there is an association between academic delay of gratification when controlling for other motivational, cognitive, and self-regulatory variables. A hierarchical regression analyses indicated that delay of gratification emerges as a significant and positive predictor of test anxiety. Although not conclusive, these finding suggest that high-test anxious students may use delay of gratification as a strategy to buffer the detrimental effect of test anxiety. The results clear indicate that self-efficacy is the strongest significant and negative predictor of test anxiety. The implications for education of these results are vast. The results suggest that teaching learners how to delay gratification could serve as an effective learning strategy to diminish the detrimental effect of test anxiety. Similarly, teaching learners how to enhance their self-efficacy beliefs may help them to overcome

cognitive blocks induced by test anxiety. It is important that educators understand that regulation of negative emotions in a classroom is an important educational aspect that need to be consider if we want the students to be fully successful.

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Table 1
Descriptive Statistics and Bivariate Correlations between Academic Delay of Gratification (ADOG) with Test Anxiety in Two Previous Studies

	Study 1			Study 2		
Variable	M	SD	r with ADOG	M	SD	r with ADOG
Test Anxiety*	2.68	1.10	.02	2.60	1.10	.02

Note: Study 1 (N = 250) is from Bembenutty, Karabenick, McKeachie, and Lin (1998). Study 2 (N = 113) is from Bembenutty and Karabenick, (1998). *Responses are based on a 5-point scale

Table 2

Cronbach Alpha for the Academic Delay of Gratification Scale, Motivational Strategies for Learning Questionnaires, with their Descriptive Statistics (N = 364)

Variables in the equation	Alpha	Mean	SD
Academic delay of gratification	.70	2.83	0.47
Motivation			
Intrinsic goal orientation	.68	4.83	1.00
Extrinsic goal orientation	.67	5.43	1.08
Task value	.91	5.42	1.14
Self-efficacy	.76	5.57	1.28
Learning Strategies			
Cognition			
Rehearsal	.66	4.57	1.28
Elaboration	.70	4.64	1.05
Organization	.63	3.74	1.24
Critical thinking	.80	4.19	1.27
Resource management			
Time and study regulation	.80	4.60	1.15
Effort regulation	.77	4.82	1.34

Note: SD = Standard deviation

Table 3

Pearson Correlations among the Academic Delay of Gratification Scale (ADOGS), Motivational Strategies for Learning Questionnaires, and Final Course Grade (N = 364).

	Correlations											
Scales	1	2	3	4	5	6	7	8	9	10	11	12
1. ADOG												
Motivation												
2. Test Anxiety	.03											
3. Intrinsic goal	.31	-.09										
4. Extrinsic goal	.35	.09	.34									
5. Task value	.30	-.07	.66	.40								
6. Self-efficacy	.21	-.33	.46	.37	.55							
Cognition												
7. Rehearsal	.42	.11	.27	.41	.32	.17						
8. Elaboration	.38	-.01	.53	.30	.54	.38	.52					
9. Organization	.39	.11	.25	.27	.24	.10	.59	.53				
10. Critical thinking	.19	.00	.47	.21	.40	.35	.24	.60	.28			
Resource Management												
11. Study regulation	.63	-.15	.44	.38	.42	.39	.53	.51	.45	.31		
12. Effort regulation	.59	-.19	.49	.38	.57	.53	.46	.55	.36	.30	.71	
13. Final course grade	.14	-.21	.20	.17	.33	.64	.08	.20	-.01	.12	.25	.37

Note: Correlations greater than .10 are significant at the $p < .05$.

Table 4
Hierarchical Regression Analyses (Beta Values) Predicting Test Anxiety (N = 364)

	Test Anxiety		
Variables in the equation	Step 1	Step 2	Step 3
Academic delay of gratification	.03	.00	.15*
Motivation			
Intrinsic goal orientation	-.03	-.06	-.03
Extrinsic goal orientation	.22**	.20**	.19**
Task value	.11	.10	.12
Self-efficacy	-.47***	-.47***	-.39***
Cognition			
Rehearsal		.06	.13*
Elaboration		-.03	.01
Organization		.05	.06
Critical thinking		.11	.09
Resource management			
Time and study regulation			-.24**
Effort regulation			-.15
Multiple R	.41	.43	.48
R^2	.17	.18	.23**
Change in R^2	.17***	.01	.04***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5

Mean Differences of Test Anxiety (Low and High), on Academic Delay of Gratification Scale (ADOGS), Motivational Strategies for Learning Questionnaires, and Final Course Grade

	Test Anxiety				
	Low (N =182)		High (N = 182)		
Variables	Mean	(SD)	Mean	(SD)	t-test
ADOG	2.83	(0.51)	2.82	(0.43)	.13
Motivation					
Intrinsic goal orientation	4.93	(1.07)	4.73	(0.91)	1.85
Extrinsic goal orientation	5.33	(1.13)	5.51	(1.01)	-1.56
Task value	5.49	(1.16)	5.31	(1.19)	1.48
Self-Efficacy	5.76	(1.01)	5.08	(1.17)	5.86***
Learning Strategies					
Cognition					
Rehearsal	4.46	(1.31)	4.67	(1.23)	-1.55
Elaboration	4.70	(1.08)	4.56	(1.02)	1.22
Organization	3.62	(1.24)	3.85	(1.23)	-1.74
Critical Thinking	4.23	(1.27)	4.14	(1.25)	0.75
Resource management					
Time and study management	4.79	(1.22)	4.40	(1.04)	3.29**
Effort management	5.07	(1.28)	4.56	(1.35)	3.66***
Final course grade	10.15	(2.24)	9.01	(2.99)	4.01***

Note: ** $p < .01$, *** $p < .001$.

Table 6

Pearson Between Academic Delay of Gratification Scale (ADOGS), Motivational Strategies for Learning Questionnaires, and Final Course Grade among High (N =182; Bold Correations) and Low Text Anxious Students (N = 182).

	Correlations											
Scales	1	2	3	4	5	6	7	8	9	10	11	12
1. ADOGS		**.31**	**.30**	**.37**	**.23**	**.48**	**.38**	**.41**	**.16**	**.60**	**.63**	**.09**
Motivation												
2. Intrinsic goal	.31		**.34**	**.61**	**.41**	**.37**	**.45**	**.30**	**.40**	**.43**	**.47**	**.15**
3. Extrinsic goal	.40	.34		**.44**	**.56**	**.37**	**.27**	**.24**	**.21**	**.39**	**.46**	**.29**
4. Task value	.24	.69	.37		**.37**	**.49**	**.19**	**.32**	**.43**	**.43**	**63**	**.31**
5. Self-efficacy	.21	.51	.27	.54		**.22**	**.34**	**.12**	**.27**	**.36**	**.50**	**.64**
Cognition												
6. Rehearsal	.13	.20	.44	.28	.18		**.52**	**.54**	**.55**	**.43**	**.54**	**.09**
7. Elaboration	.38	.58	.33	.57	.44	.54		**.58**	**.52**	**.43**	**.54**	**.17**
8. Organization	.38	.23	.27	.30	.15	.58	.54		**.31**	**.44**	**.37**	**.02**
9. Critical thinking	.21	.53	.20	.47	.45	.26	.63	.25		**.27**	**.27**	**.08**
Resource Management												
10. Study regulation	.67	.43	.41	.41	.37	.54	.56	.50	.33		**.67**	**.24**
11. Effort regulation	.57	.51	.49	.49	.52	.45	.56	.39	.32	.73		**.33**
12. Final course grade	.19	.23	.08	.34	.61	.10	.22	.01	.16	.22	.38	

Note: Correlations greater than .10 are significant at the $p < .05$.

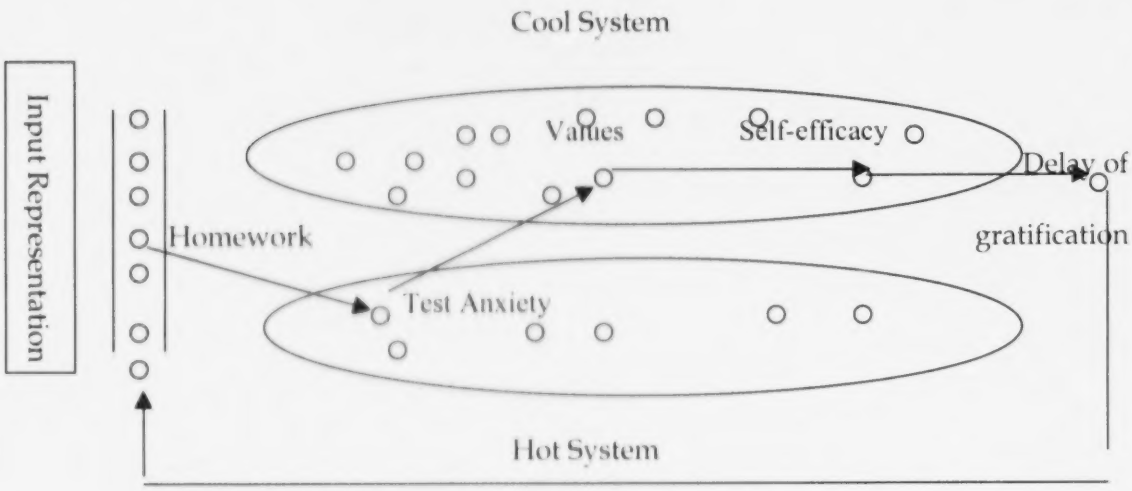
Table 7
Multiple Regression (Method = ENTER) Predicting Test Anxiety; One Block.

	β Weights
Motivation	
Intrinsic goal orientation	-.03
Extrinsic goal orientation	.22**
Task value	.11
Self-Efficacy.	-.43***
Learning Strategies	
Rehearsal	.10
Elaboration	-.00
Organization	.07
Critical Thinking	.09
Resource Management	
Combined ADOG, Effort, and Study/Time Management	-.17*
Multiple R	.45
R^2	.20***

Note: *p < .05, ** p < .01, *** p < .001. Principal components factor analysis and varimax rotation, using a root one criterion factor loading |.50| was conducted with ADOG, Effort, and Study/Time Management. One factor was extracted, which accounted for 76.2 of the variance.

Figure 1

The Hot/Cool Systems Interaction with Academic Delay of Gratification and Test Anxiety



Note: Based on Metcalfe & Mischel, 1999. The input representation (homework) leads primarily to the hot system (test anxiety) indicating that the students are experiencing negative emotions and do not want to complete the homework. However, the cool system is activated by the awareness of the negative or positive consequences and them enhance her self-efficacy beliefs. The students successfully delay gratification.

APPENDIX

ACADEMIC DELAY OF GRATIFICATION SCALE (ADOGS)

Below is a series of choices between two alternative courses of action. Please read each set of statements carefully, and relate each statement to this (introductory psychology) course. Then tell which course of action you would be more likely to choose and the strength of that choice. There are no right or wrong answers. Please respond with your true beliefs rather than the way you think you should respond. That is, tell us what you really would do under the conditions described in the statements. Do this by placing an "x" in front of that choice using the scale below:

___Definitely choose A ___Probably choose A ___Probably choose B ___Definitely choose B*

1. A. Go to a favorite concert, play, or sporting event and study less for this course even though it may mean getting a lower grade on an exam you will take tomorrow, OR
   B. Stay home and study to increase your chances of getting a higher grade.

2. A. Study a little every day for an exam in this course and spend less time with your friends, OR
   B. Spend more time with your friends and cram just before the test.

3. A. Miss several classes to accept an invitation for a very interesting trip, OR
   B. Delay going on the trip until the course is over.

4. A. Go to a party the night before a test for this course and study only if you have time, OR
   B. Study first and party only if you have time.

5. A. Spend most of your time studying just the interesting material in this course even though it may mean not doing so well, OR
   B. Study all the material that is assigned to increase your chances of doing well in the course.

6. A. Skip this class when the weather is nice and try to get the notes from somebody later, OR
   B. Attend classes to make certain that you do not miss something even though the weather is nice outside.

7. A. Stay in the library to make certain that you finish an assignment in this course that is due the next day, OR
   B. Leave to have fun with your friends and try to complete it when you get home later that night.

8. A. Study for this course in a place with a lot of pleasant distractions, OR
   B. Study in a place where there are fewer distractions to increase the likelihood that you will learn the material.

9. A. Leave right after class to do something you like even though it means possibly not understanding that material for the exam, OR
   B. Stay after class to ask your instructor to clarify some material for an exam that you do not understand.

10. A. Select an instructor for this course who is fun even though he/she does not do a good job covering the course material, OR
    B. Select an instructor for this course who is not as much fun but who does a good job covering the course material.

Note: *This response scale follows each question. Responses are coded 1 to 4. Mean item scores are added and divided by 10. The mean total ranges from 1 to 4.

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